

individual member of each whorl, sepal, petal, stamen, carpel. This, we venture to think, is a mistake. We have now used for some time the contractions Ca. Co. An. Gn., which we prefer, the only objection being that this formula contains eight letters instead of five.

Many and great difficulties must have been encountered in translating the second book, and these difficulties seem to have been successfully overcome. We have no doubt that further experience will suggest changes and improvements even in the admirable book now before us.

The third book treats of Physiological Botany, and is divided into seven chapters. The first chapter is devoted to the molecular forces in the plant, and the second to the chemical processes in the plant. Naegeli's theory that organised bodies consist of isolated particles or molecules between which water penetrates is here fully described, and the value of the theory in explaining nutrition and growth by intussusception pointed out. The movements of water and gases in plants are also treated of in this chapter. The second chapter deals with the elementary constituents of the food of plants, assimilation and metastasis, and respiration in plants. Sachs describes the separation of oxygen and fixation of carbon as assimilation, and limits the application of the term respiration to the taking up of oxygen and liberation of carbon dioxide. The influence of external conditions, as temperature, light, electricity, and gravitation in plants, forms the subject of the third chapter. The mechanical laws of growth, including the movements of growing parts, are fully described in chapter iv. This chapter will be read with much interest, and many of the statements will be found to be new to English students. The fifth chapter gives a careful *résumé* of what is known regarding the movements met with in full-grown parts of plants, whether periodic or dependent on the action of stimuli. Chapter vi. is devoted to the phenomena of sexual reproduction, the sections on the influence of relationship on sexual cells, and on hybridisation being of much importance. The last chapter is devoted to the origin of species, to varieties, and to the Theory of Descent.

In closing the book after giving the above brief sketch of its contents, we cannot but express our satisfaction at the manner in which Messrs. Bennett and Dyer have done their work. The notes appended to the English edition are of much value, and will assist the student in his studies. We have but one objection to the work, and that is its high price as compared with the German edition. Surely the price will be an obstacle in the way of its extensive circulation. Could anything be done to obviate this? Sachs himself has already issued the physiological portion of the third German edition separately. Why not permit students to obtain one or other of the three books separately? Or might not an abridgement be made, somewhat on the principle of Prantl's *Lehrbuch*? As a text-book it must exercise a most powerful influence on botanical teaching in this country, and while it will supersede all other text-books for advanced students, we fear that its size and price may prevent it being so widely used as it ought to be. With Sachs' text-book within reach, teachers and students will be themselves to blame if they are behind the time in botanical science. Then, the English edition being translated from the third German edition, students can

readily keep up their knowledge, because the "*Botanischer Jahresbericht*," beginning as it does in 1873, will refer them to all the more recent literature. While we have thus expressed our entire satisfaction with the work of the translators and annotators, let us not forget to mention that the way in which the work is got up does credit both to the Clarendon Press and Messrs. Macmillan and Co.

W. R. M'NAB

DR. CHAMBERS'S "*MANUAL OF DIET*"  
*A Manual of Diet in Health and Disease.* By T. King Chambers, M.D. (Smith, Elder, and Co., 1875.)

THERE are many writers who, immediately they place pen to paper, seem to be affected with a certain formality of diction and severity of style which prevents them doing justice to their subject in the eyes of the more easily satisfied public, who, while desiring instruction, prefer it to be mixed with a certain amount of that form of interest which can be given it by an apparent "at homeness" on the part of the author. Dr. Chambers does not suffer from this fault. In the work before us he has produced one of the most readable as well as practical manuals on diet which we could want to see. The interest is maintained from beginning to end, and much valuable information is given on many of the important topics of everyday life without the uncomfortable sensation of any effort being needed to obtain it.

The subject is treated of under three headings: General Dietetics, Special Dietetics of Health, and Dietetics in Sickness. The author commences with the question—What is the natural food of man? Flesh-eating animals have teeth, jaws, and limbs suitable for capture and tearing, vegetable feeders have bulky viscera, and so on. Applying similar arguments to the human race, "to judge by form and structure alone, the natural food of an adult man must be pronounced to be *nothing*;" from which we must necessarily deduce, as is indicated by other considerations, that man as man assumed his special characters *after* he commenced the employment of instruments for offence and defence. In fact, the developed heel, with which is correlated the non-arboreal habit, is incompatible with the naturally defenceless condition of our species.

The space which is gained by the omission of the chapters on the chemistry, botany, &c., of food stuffs to be found in most works on diet and food, is, as we are told in the preface, employed in a full discussion of many matters connecting food and drink with the daily current of social life. The number of observations which will come home vividly to almost anyone turning over the pages of this work is so numerous that we think a few quotations will give the best idea of their scope. For instance, salads form an important article of diet in every family. "The salad ought to be dressed by one of the daughters of the house, after she has herself dressed for dinner, singing, if not with voice, with her clean, cool fingers, sharp silver knife, and wooden spoon—

"Weaving spiders, come not here;  
Hence, you long-legged spinners, hence:  
Beetles black, approach not near;  
Worm nor snail, do no offence."

Since the introduction of railways the difficulty in procuring good mutton is acutely felt in all but large cities, and the author makes a suggestion which, where carried

out, would much reduce the inconvenience. He recommends those who can do so "to join a 'mutton club,' buying the lambs of a full-sized breed, and keeping them to at least three-and-a-half years old before killing. The price per pound will not be less than charged by the butcher, but it will supply an article twice as good as his." The remarks with reference to eggs are also very much to the point. "High game has fortunately gone out of fashion, and the most frequent form in which we now meet with decomposing albuminoid matter is that of a fusty egg. Some housekeepers seem to consider this quite good enough for made dishes, and thus spoil material worth ten times what they save by their nasty economy. No egg should be allowed to enter the kitchen that has the slightest smell of rotten straw."

In accordance with the opinion of most of the medical profession and of a large body of the public, we read that "as a regular beverage for a healthy person there is no wine in the English market equal to claret." No doubt the statistics of a few years hence will prove that the present reaction against port and sherry will make itself evident in the considerable diminution of the number of those who are liable to be attacked with the gout, and so demonstrate the advantages of the lighter wine.

In the section on the special dietetics of health many important remarks are to be found. Hints are given to those who pursue the commercial, the literary, and professional life, special chapters being devoted to each. The regimen of infancy and motherhood, of childhood and youth, are not omitted. Dr. Chambers is not the only author who inveighs against afternoon tea, and we cannot agree with the argument on which his objections are based. He tells us that "the dilution and washing away of the gastric secretion weakens its power of digesting the subsequent dinner, improperly blunts the appetite, and not unfrequently generates flatulence and dyspepsia." But the gastric juice is not secreted if solid food is not taken, and any fluid introduced into the stomach can hardly but be absorbed within a quarter of an hour or so. The substitute suggested, "a biscuit, and an orange or an ice," is, in our estimation, much more injurious.

Over thirty pages are devoted to the question of the value of alcohol, the results being too lengthy to summarise on the present occasion. They are well worth reviewing. "So me well-meaning persons think to discourage intemperance in drink by affecting a cynical carelessness as to the quality of that which is consumed. . . . However little a man's purse allows him to drink, let it be good."

The question of the dietetics of disease will appeal to all who have the charge or any interest in those who are invalided. They bear the same practical impress as the other portions of the work. Though some of the author's suggestions may appear to be founded on a somewhat dogmatic basis, they all have an element of truth in them which may lead the reader to think twice of the reasons why he is accustomed to adopt any line of action which may be directly opposed to them.

#### OUR BOOK SHELF

*An Elementary Exposition of the Doctrine of Energy.*  
By D. D. Heath, M. A., formerly Fellow of Trinity College, Cambridge. (Longmans, Green, and Co.)

In this book we have a very good elementary exposition

of the Doctrine of Energy; perhaps, however, better adapted for the use of schools than for the general public. Indeed, we are told in the preface that the work was developed from a set of lectures given to the senior classes of Surrey County School. In his discussion of fundamental units the author makes some very good and original remarks. He tells us, for instance, in connection with the first law of motion, that "the *rate* and the *direction* of motion with and in which (respectively) a body is moving at any moment is to be considered as part of its *actual condition* at that moment, which it will retain until some adequate cause changes either the velocity or the direction, or both. We may reasonably inquire *how it got* the motion it has, as we may how it came by its shape or its temperature; and again, under what circumstances it will change any of these properties; but not *why*, having got them, it keeps them."

After dismissing the subject of fundamental units, the writer goes on to dynamical energy, a subject which is fully and fairly discussed. The author next proceeds to thermal and other energies, and ends by a brief account of molecular theories. If we have any fault to find, it is that undue preference seems to be given to the British system of units, while the decimal system is overlooked.

We think, too, that in the introductory part of the work the author is not very clear in his statement with regard to energy, where he tells us we may define it to be "the capacity or power of any body or system of bodies, when in a given condition, to do a certain measurable quantity of work; that is, to change its own condition and that of other bodies, exhausting its power by the using of it." We think that the second part of this definition might have been omitted with advantage.

The author, as he tells us in his preface, has endeavoured to give the young student some conception of the *possibility* of explaining the conservation of energy by the theory that all phenomenal changes are really in themselves changes of motion and position among the molecules or ultimate atoms of substances; and he adds the hope that he has succeeded in presenting this as exhibiting a probable surmise, which may be false without vitiating the doctrine previously developed.

This strikes us as being very well put. The conservation of energy would hold if we imagine the universe to be composed of ultimate atoms with forces acting in lines between them; but should it be found that this last conception is inapplicable to portions of the universe, as, for instance, the medium which conveys light, nevertheless it does not follow that the conservation of energy does not still hold true.

*The Commercial Handbook of Chemical Analysis.* By A. Normandy. New edition, enlarged, by Henry M. Noad, Ph.D., F.R.S. (London: Lockwood and Co., 1875.)

WHEN the late Dr. Normandy first published his work on Commercial Analysis the Adulteration Act did not exist, and the book was chiefly used by chemical manufacturers and by the small class of practical analysts. Dr. Noad's enlarged edition of the work appears very opportunely, and it will be found to be essential to the analysts appointed under the new Act. It contains, in alphabetical order, a concise list of all ordinary substances which can require to be analysed in connection with food and drink, and in addition the methods of analysing many substances which can only be required in special manufactures, or are only used as drugs. Each article commences with an account of the substance in its pure state: this is followed by a list of the most common impurities or adulterations, and then by the best means of detecting them. The adulterations of some common commodities are somewhat startling; thus, bread may contain rye and barley flour, oatmeal, pea and bean meal, potato starch and rice flour, while of mineral constituents there may be lime, alum, magnesia, ground soapstone,